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February 5, 2012

Ms. Sabrina Forrest
Site Assessment Manager
U.S. Environmental Protection Agency, Region 8
1595 Wynkoop Street
Mail Code: 8EPR-B
Denver, Colorado 80202-1129

SUBJECT: **START 3, EPA Region 8, Contract No. EP-W-05-050, TDD No. 1008-13**
Upper Animas Mining District/Upper Cement Creek,
Silverton, San Juan County, Colorado
HRS Quickscore 3.0.3 and scoring narrative.

Dear Ms. Forrest:

Attached are two copies of the HRS QuickScore 3.0.3 and scoring narrative for the Upper Animas Mining District/Upper Cement Creek site in San Juan County, Colorado. The scoring focused on the Upper Cement Creek sources, pathways, and targets, specifically those identified during the September 2011 wetlands delineation study. Sampling activities were conducted in October and November 2010. This document is submitted for your approval.

If you have any questions, please call me at 303-291-8270.

Very truly yours,

URS OPERATING SERVICES, INC.

Barry Hayhurst
Environmental Scientist

cc: C. W. Baker/UOS (w/o attachment)
File/UOS

HRS Quick Score Scenario for the Upper Animas Mining District/Upper Cement Creek
Site Re-Assessment
TDD 1008-13

Site Quick Score = 30.00

Samples of potential sources of mine waste rock piles and mine adit discharges, and environmental samples of surface water and sediment along Cement Creek were collected in late October and early November 2010 by the EPA START Contractor as a part of a site reassessment conducted under TDD 1008-13. The four identified mine waste rock pile sources produce an aggregate waste quantity factor value of 10,000. Elevated concentrations of cadmium, copper, manganese were identified in the surface water of Cement Creek for a distance of 1.98 miles downstream from the most upstream source at the Grand Mogul Mine. Wetlands along Upper Cement Creek were delineated according to the Hazardous Ranking System (HRS) definition of wetlands found in 40 CFR 230.3 in late August and early September 2011 by wetlands experts. The qualifying streamside wetlands that are estimated to be found within the zone of observed release of contaminants from documented sources total more than 0.25 mile, but less than 1 mile. These data result in a site score of 30 for the Environmental Pathway of the Surface Water Pathway based solely on a waste factor value of 10,000 and between 0.25 and 1 mile of qualifying streamside wetlands located within the zone of observed contamination.

Anecdotal evidence has been presented that the Animas River below the confluence with Cement Creek is a fishery, but no evidence has been produced that documents that fish from potentially impacted waters are consumed. Anecdotal evidence has also been presented that Cement Creek contains potential threatened and sensitive environments for Threatened and Endangered (T&E) species, but no documentation of this has yet been produced.

The area of observed contamination is not continuously inhabited because of the extreme winter weather conditions that exist for much of the year at the upper elevations of Upper Cement Creek. Groundwater wells potentially exist in the area, but have not been evaluated. The residential soil exposure pathway and groundwater pathway were not evaluated for this QuickScore. The area is, however, a popular summer vacation area with people driving, rockhounding, and hiking in the area. It is possible that there could be concerns about the air pathway, but the deep snow cover over Upper Cement Creek for more than half the year mitigates against the possibility.

Sources

Source 1: The mine waste rock piles at the Grand Mogul Mine. The piles total an estimated 26,521 cubic yards. The mine waste rock contains arsenic, cadmium, chromium, copper, manganese, and zinc. Based on the source type and divisor of 2.5 from HRS Table 2.5, the hazardous waste quantity value (HWQ) for the mine waste pile is 10,608.4. No engineered containment features for the mine waste rock piles are documented.

Source 2: The mine waste rock pile at the Mogul Mine. The pile totals an estimated 41,374.7 cubic yards. The mine waste rock contains arsenic, cadmium, chromium, copper, manganese, and zinc. Based on the source type and divisor of 2.5 from HRS Table 2.5, the HWQ for the mine waste rock pile is 16,549.9. No engineered containment features for the mine waste rock piles are documented.

Source 3: The mine waste water adit discharge at the Mogul Mine. The volume of discharge is not known, but is greater than 0. The adit discharge contains arsenic, cadmium, chromium, copper, manganese, and zinc. The HWQ calculated by QuickScore 3.0.3 is based on the source having an undetermined adit discharge volume greater than 0, which is assigned as 1.0E-7. There is an initial stretch of partial containment with a lined ditch channeling the flow, but the ditch ends part way down the waste rock pile.

Source 4: The mine waste rock pile at the Red and Bonita Mine. The pile totals an estimated 3,962 cubic yards. The mine waste rock contains arsenic, cadmium, chromium, copper, manganese, and zinc. Based on the source type and divisor of 2.5 from HRS Table 2.5, the HWQ for the mine waste rock pile is 1,584.8. No engineered containment features for the mine waste rock pile are documented.

Source 5: The mine waste water adit discharge at the Gold Kind 7 Level Mine. The volume of discharge is not known, but is greater than 0. The adit discharge contains arsenic, cadmium, chromium, copper, manganese, and zinc. The HWQ calculated by QuickScore 3.0.3 is based on the source having an undetermined adit discharge volume greater than 0, which is assigned as 1.0E-7. There is an initial stretch of partial containment with a lined ditch channeling the flow, but the ditch ends part way down the waste rock pile.

Source 6: The mine waste rock pile at the Gold King 7 Level Mine. The pile totals an estimated 12,500 cubic yards. The mine waste rock contains arsenic, cadmium, chromium, copper, manganese, and zinc. The HWQ for the mine waste rock pile is 5,000. The North Fork of Cement Creek was documented to be actively eroding the mine waste rock pile at the Gold King 7 Level Mine. No engineered containment features for the mine waste rock pile are documented.

Source 7: The mine waste water adit discharge at the American Tunnel. The volume of discharge is not known, but is greater than 0. The adit discharge contains arsenic, cadmium, chromium, copper, manganese, and zinc. The HWQ calculated by QuickScore 3.0.3 is based on the source having an undetermined adit discharge volume greater than 0, which is assigned as 1.0E-7. There is an initial stretch of partial containment with a lined ditch channeling the flow, but the ditch ends part way down the waste rock pile.

The total of the HWQ for the seven sources is 33,742.3. Using Table 2-6 to evaluate the total of 33,742.3, it is seen that 33,742.3 falls within the range "Greater than 10,000 to 1,000,000," which is assigned a value of 10,000. The hazardous waste quantity factor value for the seven described sources at the site taken from Table 2-6 of the HRS is 10,000.

Targets

Wetlands were identified during the September 2011 wetlands delineation and sensitive environment survey along Cement Creek from downstream of the Grand Mogul Mine to the confluence of Cement Creek with Ohio Gulch. Delineation of the wetlands from the Grand Mogul Mine to Ohio Gulch was conducted by qualified experts in September 2011. Wetlands were identified using the criteria of 40 CFR 230.3. It was estimated that the extent of stream-side wetlands will be greater than 0.25 mile and less than 1.0 mile, which resulted in an assigned value from HRS Table 4-24 of 25.

The most downstream extent of elevated contamination in Cement Creek was found at sample location UASW004 just below the confluence with the South Fork of Cement Creek, a distance of 1.98 miles downstream of the Grand Mogul Mine probable point of entry (PPE). Cadmium found in the sources is elevated 3 times background at 16.1 µg/l. The toxicity value of cadmium is the highest toxicity value of all the site contaminants, which include cadmium, chromium, copper, lead, manganese, and zinc.

Conclusion

The hazardous waste quantity factor value of the seven sources found along Upper Cement Creek is 10,000. There are 1.98 miles of Cement Creek between the most upstream PPE and the most downstream sample location that document concentrations of dissolved cadmium in the surface water at 3 times background. The toxicity value of cadmium is 10,000, which results in a Bioaccumulation Potential Factor Value (BAP) of 50,000 – the highest of all the site contaminants, which include cadmium, chromium, copper, lead, manganese, and zinc. An estimated 0.25 to 0.99 mile of HRS qualifying streamside wetlands is found on the 1.98 mile stretch of Cement Creek between the most upstream PPE and the most downstream sample location showing a concentration of dissolved cadmium 3 times background. The resulting Factor Value for the wetlands is 25.

These factor values are used to calculate a Surface Water/Environmental Pathway score of 60, which results in an overall site score of 30.

****** CONFIDENTIAL ******
******PRE-DECISIONAL DOCUMENT ******
****** SUMMARY SCORESHEET ******
****** FOR COMPUTING PROJECTED HRS SCORE ******

****** Do Not Cite or Quote ******

Site Name: Upper Animas Mining District/Upper Cement Creek evaluation

Region: Region 8

Scenario Name: Surface Water Dissolved Metals contamination & wetlands

City, County, State: Silverton, San Juan County, Colorado

Evaluator: Hayhurst

EPA ID#: CON000802893

Date: 10/26/2011

Lat/Long: 37:53:24,-107:39:9

Congressional District:

This Scoresheet is for: ESI

Scenario Name: Surface Water Dissolved Metals contamination & wetlands

Description: Surface water samples for dissolved metals collected in late October and early November 2010. Contamination in a stretch of Cement Creek with HRS qualifying wetlands.

	S pathway	S^2 pathway
Ground Water Migration Pathway Score (S_{gw})	0.0	0.0
Surface Water Migration Pathway Score (S_{sw})	60.0	3600.0
Soil Exposure Pathway Score (S_s)	0.0	0.0
Air Migration Score (S_a)	0.0	0.0
$S^2_{gw} + S^2_{sw} + S^2_s + S^2_a$		3600.0
$(S^2_{gw} + S^2_{sw} + S^2_s + S^2_a)/4$		900.0
$/ (S^2_{gw} + S^2_{sw} + S^2_s + S^2_a)/4$		30.0

Pathways not assigned a score (explain):

TABLE 4-1 --SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

Factor categories and factors	Maximum Value	Value Assigned	
Watershed Evaluated: Cement Creek			
Drinking Water Threat			
Likelihood of Release:			
1. Observed Release	550	550.0	
2. Potential to Release by Overland Flow:			
2a. Containment	10	9.0	
2b. Runoff	10	2.0	
2c. Distance to Surface Water	5	25.0	
2d. Potential to Release by Overland Flow [lines 2a(2b + 2c)]	35	243.0	
3.Potential to Release by Flood:			
3a. Containment (Flood)	10	9.0	
3b. Flood Frequency	50	0.0	
3c. Potential to Release by Flood (lines 3a x 3b)	500	0.0	
4. Potential to Release (lines 2d + 3c, subject to a maximum of 500)	500	243.0	
5. Likelihood of Release (higher of lines 1 and 4)	550		550.0
Waste Characteristics:			
6. Toxicity/Persistence	(a)	0.0	
7. Hazardous Waste Quantity	(a)	10000.0	
8. Waste Characteristics	100		0.0
Targets:			
9. Nearest Intake	50	0.0	
10. Population:			
10a. Level I Concentrations	(b)	0.0	
10b. Level II Concentrations	(b)	0.0	
10c. Potential Contamination	(b)	0.0	
10d. Population (lines 10a + 10b + 10c)	(b)	0.0	
11. Resources	5	0.0	
12. Targets (lines 9 + 10d + 11)	(b)		0.0
Drinking Water Threat Score:			
13. Drinking Water Threat Score [(lines 5x8x12)/82,500, subject to a max of 100]	100		0.0
Human Food Chain Threat			
Likelihood of Release:			
14. Likelihood of Release (same value as line 5)	550		550.0
Waste Characteristics:			
15. Toxicity/Persistence/Bioaccumulation	(a)	0.0	
16. Hazardous Waste Quantity	(a)	10000.0	
17. Waste Characteristics	1000		0.0
Targets:			
18. Food Chain Individual	50	0.0	
19. Population			
19a. Level I Concentration	(b)	0.0	
19b. Level II Concentration	(b)	0.0	
19c. Potential Human Food Chain Contamination	(b)	0.0	
19d. Population (lines 19a + 19b + 19c)	(b)	0.0	
20. Targets (lines 18 + 19d)	(b)		0.0
Human Food Chain Threat Score:			
21. Human Food Chain Threat Score [(lines 14x17x20)/82500, subject to max of 100]	100		0.0
Environmental Threat			
Likelihood of Release:			
22. Likelihood of Release (same value as line 5)	550		550.0
Waste Characteristics:			
23. Ecosystem Toxicity/Persistence/Bioaccumulation	(a)	5.0E8	
24. Hazardous Waste Quantity	(a)	10000.0	
25. Waste Characteristics	1000		1000.0

Targets:			
26. Sensitive Environments			
26a. Level I Concentrations	(b)	0.0	
26b. Level II Concentrations	(b)	25.0	
26c. Potential Contamination	(b)	0.0	
26d. Sensitive Environments (lines 26a + 26b + 26c)	(b)	25.0	
27. Targets (value from line 26d)	(b)		25.0
Environmental Threat Score:			
28. Environmental Threat Score [(lines 22x25x27)/82,500 subject to a max of 60]	60		60.0
Surface Water Overland/Flood Migration Component Score for a Watershed			
29. Watershed Score[c] (lines 13+21+28, subject to a max of 100}	100		60.00
Surface Water Overland/Flood Migration Component Score			
30. Component Score (S_{sw})[c] (highest score from line 29 for all watersheds evaluated)	100		60.00

[a] Maximum value applies to waste characteristics category
[b] Maximum value not applicable
[c] Do not round to nearest integer

TABLE 4-25 --GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET

Factor categories and factors	Maximum Value	Value Assigned	
Watershed Evaluated: Cement Creek			
Drinking Water Threat			
Likelihood of Release to an Aquifer:			
1. Observed Release	550	0.0	
2. Potential to Release:			
2a. Containment	10	0.0	
2b. Net Precipitation	10	0.0	
2c. Depth to Aquifer	5	0.0	
2d. Travel Time	35	0.0	
2e. Potential to Release [lines 2a(2b + 2c + 2d)]	500	0.0	
3. Likelihood of Release (higher of lines 1 and 2e)	550		0.0
Waste Characteristics:			
4. Toxicity/Mobility	(a)	0.0	
5. Hazardous Waste Quantity	(a)	0.0	
6. Waste Characteristics	100		0.0
Targets:			
7. Nearest Well	(b)	0.0	
8. Population:			
8a. Level I Concentrations	(b)	0.0	
8b. Level II Concentrations	(b)	0.0	
8c. Potential Contamination	(b)	0.0	
8d. Population (lines 8a + 8b + 8c)	(b)	0.0	
9. Resources	5	0.0	
10. Targets (lines 7 + 8d + 9)	(b)		0.0
Drinking Water Threat Score:			
11. Drinking Water Threat Score ([lines 3 x 6 x 10]/82,500, subject to max of 100)	100		0.0
Human Food Chain Threat			
Likelihood of Release:			
12. Likelihood of Release (same value as line 3)	550	0.0	
Waste Characteristics:			
13. Toxicity/Mobility/Persistence/Bioaccumulation	(a)	0.0	
14. Hazardous Waste Quantity	(a)	0.0	
15. Waste Characteristics	1000		0.0
Targets:			
16. Food Chain Individual	50	0.0	
17. Population			
17a. Level I Concentration	(b)	0.0	
17b. Level II Concentration	(b)	0.0	
17c. Potential Human Food Chain Contamination	(b)	0.0	
17d. Population (lines 17a + 17b + 17c)	(b)	0.0	
18. Targets (lines 16 + 17d)	(b)		0.0
Human Food Chain Threat Score:			
19. Human Food Chain Threat Score [(lines 12x15x18)/82,500,suject to max of 100]	100		0.0
Environmental Threat			
Likelihood of Release:			
20. Likelihood of Release (same value as line 3)	550		0.0
Waste Characteristics:			
21. Ecosystem Toxicity/Persistence/Bioaccumulation	(a)	0.0	
22. Hazardous Waste Quantity	(a)	0.0	
23. Waste Characteristics	1000		0.0
Targets:			
24. Sensitive Environments			
24a. Level I Concentrations	(b)	0.0	
24b. Level II Concentrations	(b)	0.0	

24c. Potential Contamination	(b)	0.0	
24d. Sensitive Environments (lines 24a + 24b + 24c)	(b)	0.0	
25. Targets (value from line 24d)	(b)		0.0
Environmental Threat Score:			
26. Environmental Threat Score [(lines 20x23x25)/82,500 subject to a max of 60]	60		0.0
Ground Water to Surface Water Migration Component Score for a Watershed			
27. Watershed Score[c] (lines 11 + 19 + 28, subject to a max of 100)	100		0.0
28. Component Score (S_{gs})[c] (highest score from line 27 for all watersheds evaluated, subject to a max of 100)	100		0.0

[a] Maximum value applies to waste characteristics category
[b] Maximum value not applicable
[c] Do not round to nearest integer

TABLE 5-1 --SOIL EXPOSURE PATHWAY SCORESHEET

Factor categories and factors	Maximum Value	Value Assigned	
Likelihood of Exposure:			
1. Likelihood of Exposure	550		
Waste Characteristics:			
2. Toxicity	(a)	0.0	
3. Hazardous Waste Quantity	(a)		
4. Waste Characteristics	100		0.0
Targets:			
5. Resident Individual	50		
6. Resident Population:			
6a. Level I Concentrations	(b)	0	
6b. Level II Concentrations	(b)		
6c. Population (lines 6a + 6b)	(b)		
7. Workers	15	0.0	
8. Resources	5		
9. Terrestrial Sensitive Environments	(c)		
10. Targets (lines 5 + 6c + 7 + 8 + 9)	(b)		0.0
Resident Population Threat Score			
11. Resident Population Threat Score (lines 1 x 4 x 10)	(b)		0.0
Nearby Population Threat			
Likelihood of Exposure:			
12. Attractiveness/Accessibility	100	0.0	
13. Area of Contamination	100	5.0	
14. Likelihood of Exposure	500		0.0
Waste Characteristics:			
15. Toxicity	(a)	0.0	
16. Hazardous Waste Quantity	(a)	0.0	
17. Waste Characteristics	100		0.0
Targets:			
18. Nearby Individual	1	0.0	
19. Population Within 1 Mile	(b)		
20. Targets (lines 18 + 19)	(b)		
Nearby Population Threat Score			
21. Nearby Population Threat (lines 14 x 17 x 20)	(b)		0.0
Soil Exposure Pathway Score:			
22. Pathway Score[d] (S_s), [lines (11+21)/82,500, subject to max of 100]	100		0.0

[a] Maximum value applies to waste characteristics category
[b] Maximum value not applicable
[c] No specific maximum value applies to factor. However, pathway score based solely on terrestrial sensitive environments is limited to a maximum of 60
[d] Do not round to nearest integer

TABLE 6-1 --AIR MIGRATION PATHWAY SCORESHEET

Factor categories and factors	Maximum Value	Value Assigned
Likelihood of Release:		
1. Observed Release	550	
2. Potential to Release:		
2a. Gas Potential to Release	500	
2b. Particulate Potential to Release	500	
2c. Potential to Release (higher of lines 2a and 2b)	500	
3. Likelihood of Release (higher of lines 1 and 2c)	550	
Waste Characteristics:		
4. Toxicity/Mobility	(a)	
5. Hazardous Waste Quantity	(a)	
6. Waste Characteristics	100	
Targets:		
7. Nearest Individual	50	
8. Population:		
8a. Level I Concentrations	(b)	
8b. Level II Concentrations	(b)	
8c. Potential Contamination	(c)	
8d. Population (lines 8a + 8b + 8c)	(b)	
9. Resources	5	
10. Sensitive Environments:		
10a. Actual Contamination	(c)	
10b. Potential Contamination	(c)	
10c. Sensitive Environments (lines 10a + 10b)	(c)	
11. Targets (lines 7 + 8d + 9 + 10c)	(b)	
Air Migration Pathway Score:		
12. Pathway Score (S_a) [(lines 3 x 6 x 11)/82,500][d]	100	

[a] Maximum value applies to waste characteristics category
[b] Maximum value not applicable
[c] No specific maximum value applies to factor. However, pathway score based solely on sensitive environments is limited to a maximum of 60.
[d] Do not round to nearest integer